RESEARCHES ON MEDUSAE.

The Cubomedusae. By Franklin Story Conant. (Memoirs from the Biological Laboratory of the Johns Hopkins University, vol. iv. No. 1.) Pp. xvi + 61, and plates. (Baltimore: Johns Hopkins Press, 1898.)

IT is one of the characteristics of some of the more important American Universities that they advance knowledge, employ the best of their young graduates, and at the same time add to the treasures of their museums by equipping expeditions to explore unknown regions, both of sea and land. In this way the archaeology, ethnology, geology, palaeontology, and marine zoology of Central and North America have all benefited largely; and the results of these College expeditions are to be seen in several of the Transatlantic Museums and Universities.

Last year (1897) was unfortunately most disastrous to the marine biological expeditions of two of the leading American Universities: Columbia at New York, and the Johns Hopkins at Baltimore. The Columbia University Expedition to Alaska was wrecked on the return voyage by running on the West Devil rock in Dixon entrance, the steamer sinking almost at once in deep water, and the party barely escaping with their lives (one of them, young Mr. B. B. Griffin, has unfortunately died since), while all their collections, notes, drawings, theses, and other property were lost. The Johns Hopkins Expedition to Port Antonio, in Jamaica, had even a more tragic termination. Prof. Humphrey, the leader of the expedition, died of yellow fever after a few hours' illness the day (August 17) they were to have sailed for home. Dr. Conant, the second in command, and Dr. Clark considered it their duty, under the circumstances, not to leave. Clark was then taken ill and recovered; but when they eventually sailed from Port Antonio, on September 6, Conant became ill on the second day at sea, and died on September 13 in Boston.

The present volume consists of Dr. Conant's researches on the Cubomedusae completed, and accepted by the Johns Hopkins University as a dissertation for the degree of Doctor of Philosophy, just before the author sailed on the fatal expedition to Port Antonio, and now published as a memorial by his friends, fellow-students and instructors at the University. Dr. Conant had been with the Johns Hopkins marine laboratory party at Jamaica in June 1896, and the discovery then of two new species of Cubomedusae in Kingston Harbour led him to the further study of the group. Cubomedusae are comparatively rare jelly-fish, and are of morphological interest because of the relatively high degree of development attained by their nervous system and sense-organs. After a systematic review of the position of his new species (one of them the type of a new family), Dr. Conant gives an excellent account of the anatomy and histology, with a specially full description of the nervous system and of the highly-developed eyes and associated sense-organs. Eight clearly drawn plates, nearly all the figures being from drawings by the author, illustrate satisfactorily this monograph, which is of special interest, first as giving an account of a rare group of medusae, and secondly because of its sad associations. Dr. Conant was a talented and high-souled young zoologist, who seems to have sacrificed his life to a sense of duty and devotion to others.

During this last stay in Jamaica, Conant seems to have been working largely on physiological problems especially of the sense-organs, such as the action of retinal pigment-cells under the influence of light and darkness; and also on the embryology of the Cubomedusae. We are glad to learn from Prof. W. K. Brooks, that Conant's notes are so full and so advanced that he hopes to be able to have them completed and published before long.

W. A. H.

OUR BOOK SHELF.

Special Report on the Beet-Sugar Industry in the United States. Pp. 240. (Washington: Government Printing Office, 1898.)

FOR some time the United States Department of Agriculture has been instituting and directing experiments to ascertain where sugar-producing plants can be grown most profitably. The present volume contains the results of this investigation so far as concerns the beet-sugar industry. It is divided into two parts, one part consisting of the report of the chemist of the Department, Dr. H. W. Wiley, while the other consists of the report of the field agent, Mr. C. F. Saylor, who has personally visited and examined the plantations and factories concerned in the beet-sugar industry in a large number of districts.

The facts and figures presented in the volume justify the attention which the Department of Agriculture has given to the development of this important industry. How widespread is the interest taken in the subject may be judged by the fact that 150,000 copies of a farmers' bulletin upon sugar-beet were applied for last year, and 60,000 copies of the present report have been printed for distribution.

Numerous packets of sugar-beet seed were sent to different parts of the United States last year with the object of obtaining information as to the regions in which the sugar industry is most likely to succeed. There are, however, such great differences in soils and climatic conditions in the United States, that seeds which are suitable for one locality may not succeed in another. Dr. Wiley therefore points out that the experiments which the Department of Agriculture has conducted for several years in the analysis of beets, and the delimination of areas suited to beet culture, require now to be supplemented by a more rigid scientific attempt to develop beets of characteristics best suited to the various localities.

The opinion of Mr. Saylor upon the industry is decidedly optimistic. He says: "There is no doubt that the United States has a wide and varied extent of land that will successfully grow high-grade beets, that the enterprise of the people of this country will appreciate this fact, and that in a short time all the sugar consumed in this country will be furnished by our own people." Whether this prediction will be fulfilled during the next few years remains to be proved; but, in any case, the Department of Agriculture is doing its best to educate and assist the farmers who cultivate lands upon which the sugar-beet can be successfully grown.

Traité d'Algèbre Supérieure. Par Henri Weber. Traduit de l'allemand sur la deuxième édition par J. Griess. Pp. 764. (Paris: Gauthier-Villars, 1898.)

THIS is a translation of the first volume of the second edition of Prof. Weber's "Lehrbuch der Algebra," and will doubtless be welcome to those who are more familiar with French than with German. The translation appears to be trustworthy, although a few misprints have crept in here and there which are not in the original; thus on pp. 71, 72, the indices $a_1, a_2 \ldots a_m$ should be replaced by

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$\mu_1, \mu_2 \ldots \mu_m$, and on p. 150 $f(x)$ has been printed instead of $f'(x)$. On p. 73 the phrase "en outre" is an imperfect equivalent for "wir setzen noch," and is likely to make the reader suppose that the symbol $\Phi\ (x, \xi)$ has been already defined. The handsome appearance of the volume, and the excellence of the printing, fully maintain M. Gauthier-Villars' high reputation.

The first edition of the "Lehrbuch" was reviewed in this journal at considerable length, so that it is unnecessary to give here any detailed account of the contents of this volume. Prof. Weber has introduced various improvements in detail, and added, amongst other things, an account of Lagrange's interpolation formula, and of Hurwitz's very interesting researches on Sturm's theorem. The extreme value and originality of the treatise become more evident the more carefully it is studied; the appearance of this translation, as well as that of the second edition at home, indicates that its great merits are being duly appreciated. G. B. M.

A Manual of the Grasses of New South Wales. By J. H. Maiden. (Sydney: Gullick, 1898.)

BROUGHT out under the authority of the Minister for Mines and Agriculture for New South Wales, the Government botanist publishes a very useful account of the grasses of the Colony. The number of species indigenous to the Colony is stated at 196, comprised in 56 genera. These numbers may be compared with the 95 species belonging to 48 genera reckoned by Hooker as natives of these islands. Under each species, in addition to the technical diagnosis, the vernacular names are given, with a reference to the published figures; the habitat and range of the species, and an account of its value for fodder and for other purposes. Then follows a key to the genera, and under each genus a key to the species. In the case of a number of the more useful or more common species, full-page illustrations are given. The volume is a very useful and valuable one; but, considering its purpose, it strikes us that its practical value would be increased by either a general description of the flower of grasses, or a glossary of technical terms; unless indeed, Australian farmers are much better acquainted than our own with botanical terminology.

Manuel de l'Explorateur. By E. Blim and Rollet de l'Isle. Pp. vii + 260. (Paris: Gauthier-Villars, 1899.)

THE object of this volume is to provide travellers in little-known regions with information which will enable them to record particulars of service to geography concerning the land traversed. In the first chapter the methods are described for determining and representing approximately the route followed and the details of the surface, using a prismatic compass and an aneroid. The astronomical observations required to define positions along the route are then explained, and it is shown how the combination of these observations with the rough survey enables an approximately accurate representation of the journey to be laid down. The determination of heights and distances by levelling and triangulation are described in the third chapter, for the instruction of explorers who wish to make a detailed study of particular districts. The two remaining chapters deal with systems of projection for the conversion of the observations to maps, and the choice and transport of the instruments referred to in the text. The sextant is not included among the instruments, the astronomical observations being made with the theodolite instead. No instructions are given as to what to observe in natural history, geology, anthropology, or other sciences; hence, the volume is not to be compared in value with the "Hints to Travellers" published by the Royal Geographical Society. Nevertheless, as a clear and very elementary manual on surveying and practical astronomy for travellers who explore without having received a preliminary scientific training, the book may prove of service.

LETTERS TO THE EDITOR

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Heredity and Fertility.

As Prof. Karl Pearson in his paper "On the Law of Ancestral Heredity," published in the *Proceedings* of the Royal Society, alludes to an investigation which he has apparently commenced into the inheritance of fertility in man, it may be of interest now to publish one which I completed some years ago, but which for various reasons has not appeared in print.

The problem to be solved was:—Do marriages of heiresses prove more or less fertile than ordinary marriages? The first desideratum was of course to get a practically homogeneous class from which to obtain the necessary data. The families enrolled in "Burke's Peerage and Baronetage" sufficed. Taking the volume for 1892—just published when this investigation was commenced—there were in it of the present generation 265 ordinary or non-heiress marriages which had produced an average of 3·8 children per marriage, forty-eight of which, or 18·5 per cent., were absolutely sterile.

Now an heiress, so called in "Burke," may be considered of the same class as an only child. Hence, taking care that both parents lived long enough after the birth of their first child to have had others, I extracted all the marriages of heiresses and female only children that occurred in "Burke" for the present generation, with the addition of a considerable number from the past generation contained in "The Lineage." There resulted:—243 marriages, averaging 3·74 children per marriage and 11·9 per cent. marriages absolutely sterile. These figures show that there is practically no difference in the fertility of ordinary marriages—3·8 per marriage—and the 3·74 fertility of heiresses and only children: the small difference of six-hundredths per cent., on so small a number as 250 marriages, being well within the ordinary limits of error. It implies that with greater numbers the results would probably be similar. Not so, however, when we come to consider the number of marriages which are absolutely sterile, for these are so much fewer with the only children marriages—6·6 per cent.—that we must say when they are fertile they are more fertile than the others.

But the problem may be attacked from the other side. If female members of the smallest families possible tend to bear fewer children than the female members of families of ordinary size, the female members of large families would tend to bear large families. Is this so? With a much greater amount of labour than would be imagined, I extracted from the same work some marriages of ladies who were members of families of five or more, *i.e.* had in each case four or more brothers or sisters, with the result that 250 marriages averaged 4·25 per marriage with 13·6 marriages quite sterile.

Summarising, we get then ladies of small families average 4·06 children per marriage, 11·1 per cent. marriages being quite sterile.

Ladies of ordinary families average 3·8 per marriage, 18·5 quite sterile.

Ladies of large families average 4·25 per marriage, 13·6 quite sterile.

This shows that the more contrasted the ladies are as regards number of brothers and sisters, the more nearly allied are the numbers of their children and the relative amount of absolute sterility. A conclusion tending to show that the cause under investigation is not a *vera causa*.

Does the female influence show itself in a change in the proportion of male to female children, assuming of course a chance distribution of the husbands as being members of small, ordinary, and large families?

	Sons.	Daughters.	Total	S. to 100 D.	Sterile.
243 heiress and only-child marriages	492	414	906	107 sons	11
265 ordinary marriages ...	514	528	1042	97 sons	18·5
250 large family marriages	553	510	1063	108 sons	13·6

The same result as before—the most contrasted classes give the most similar results.

If heredity has anything to do with this matter, which so far seems improbable, it may arise from the other side—the father's. Hence I extracted marriages of only sons, of sons of ordinary

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